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The Mineral Industry of Mexico

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The Mineral Industry of Mexico

By Orlando Martino[1]

Mexico's economic performance continued to be conditioned by the austerity program of the new Administration and the international financial crisis caused primarily by the heavy foreign debt, which was approaching $100 billion.[2] To help confront this crisis, Mexico was not able to count on substantial increases in foreign exchange earnings from crude oil exports as had been optimistically projected in the early 1980's. The small increase in earnings compared with that of 1983 resulted from a minor increase in oil prices. Some industry experts see lower oil prices by the end of this decade. From Mexico's viewpoint, however, lower oil prices would be tolerable if accompanied by a fall in interest rates. For each 1% drop in the interest rate, Mexico saves about $1.75 billion per year in interest payments. On the other hand, each dollar drop in the average price per barrel of Mexican crude oil costs the country about $550 million in earnings loss. Fortunately, during 1984, interest rates fell considerably while a substantial drop in oil prices failed to materialize, allowing Mexico's savings on its debt service to outstrip the small rise in earnings from crude oil exports.

Aside from mineral fuels, Mexico had a disappointing year as the world's leading producer and refiner of silver. Although silver output increased to an improved level not achieved since 1944, earnings from silver exports actually declined to one-half of 1980 earnings, because of significantly lower world silver prices.

Despite the discouraging situation of the world oil market in 1984, Mexico's oil industry continued to prosper, making substantial contributions to the national economy while maintaining its position as the fourth most important world oil producer and exporter. Mexico continued to be the primary supplier of foreign oil to the U.S. market. The oil industry accounted for about 11.7% of Mexico's gross domestic product (GDP), which in 1984 surpassed the expected target and grew in real terms by 3.5% over that of 1983 to an estimated $175 billion at current prices. The petroleum GDP share is smaller than might be expected because Mexico has a highly diversified economy with modern, well-developed agricultural, manufacturing, and service sectors. However, the importance of petroleum's role in the economy can be better appreciated by considering the international trade sector where the oil industry's total exports accounted for almost 69% of Mexico's total merchandise exports. The state oil company, Petróleos Mexicanos (PEMEX), provided about 35% of the central Government's fiscal revenue, while PEMEX's investment expenditures accounted for between one-fourth and one-third of total investment by the public sector.

For the first time in recent history, PEMEX announced a small reduction in proven reserves of hydrocarbons from 72.50 billion barrels of oil equivalent at yearend 1983 to 71.75 billion barrels at yearend 1984. The addition to reserves resulting from new oil and gas discoveries during 1984 was not equal to the total amount extracted during the year. This new development appeared to have created within PEMEX greater motivation to devote more funds to exploration and development.

In addition to oil, Mexico is a major world producer and exporter of metallic and industrial minerals supplied by a long-established dynamic mining-metallurgical sector. The 3.5% increase over that of 1983 in Mexico's GDP was reflected in a 3.4%

increase in the value of nonfuel mineral output. Because of the close links between the economies of Mexico and the United States, the robust growth of the U.S. economy in 1984 was an important stimulant to the increase in Mexico's mineral production. The United States is Mexico's main trading partner, and Mexico in turn is the third most important U.S. export market after Canada and Japan. Mexico's strong mineral trade dependency on the United States is shown by the fact that in 1983, Mexico exported 61% of its mining-metallurgical commodities to the United States, while 71% of Mexico's imports in the same category came from the United States. Mexican exports also benefited from the economic recovery of other industrialized countries.

The mining-metallurgical share of Mexico's GDP was about 1.3%, the same as in 1983. Employment in the sector rose by 3%. Figures available for 1983 show that the country's large private mining group, with a 49% share, contributed the major part of the sector's output, followed by a group of companies with Government equity participation, 39%; and the small- and medium-size mining group contributed 12%. The trend since 1975 shows the large private group losing its share with the Government-involved group gaining a greater share of the sector's output.

The differential changes in world mineral commodity prices had a notable impact on Mexico. The price of silver, a very key commodity for Mexico, was lower, but the prices of lead, zinc, and certain industrial commodities were higher in 1984. As a result, there were sharp changes in the relative participation of the four nonfuel mineral groups. Especially notable, the precious metals group share dropped from 44% of the output value of the mining-metallurgical sector in 1983 to 37% in 1984, while the sector share of the nonmetallic mineral group increased from 13% in 1983 to 18% in 1984.

The financial results of the mining companies were negatively impacted by the differential between the controlled-dollar exchange rate and the free-dollar rate. The exports of the companies were credited in controlled dollars, but all imports of equipment, spare parts, etc., had to be paid with dollars at the higher free rate. The industry's financial position was also adversely affected by a 59% inflation rate not matched by the Mexican peso devaluation rate. The favorable effect on the mining industry, whose income is primarily dollar based, of the large peso devaluation of late 1982, was further eroded in 1984. Careful studies made by several institutions showed that price increases of inputs to the mineral industry during 1983 were much higher than the average peso devaluation for that year. A similar situation persisted during 1984.

As expected, those mining companies with low foreign debt, and thus lower debt-servicing costs, were better able to manage the recent financial crisis. Some companies were also able to increase their productivity and diversify their investments, to increase profitability or lessen their losses. The high profitability of some of the mining companies in Mexico was due in part to the revaluation of their assets to adjust for inflation. Among the 70 most outstanding issues traded on the Mexican stock exchange in 1984, 5 are among the important mining enterprises comprising Industrias Peñoles S.A. de C.V. (Peñoles); México, Desarrollo Industrial Minero S.A. (MEDIMSA), 34% owned by ASARCO Incorporated; Empresas Frisco S.A. de C.V. y Subsidiaries (Frisco), formerly Frisco S.A. de C.V.; and Corporación Industrial Sanluis S.A. de C.V. (Sanluis), a holding company recently formed that controls the mining operations of Industrias Luismin S.A. de C.V. Peñoles and MEDIMSA are listed as corporate entities of world rank outside the United States. Peñoles is Mexico's leading miner and refiner of silver and byproduct metals and a range of industrial commodities including barite, fluorspar, magnesia, sodium sulfate, and sulfuric acid. MEDIMSA is the second largest silver producer, Mexico's leading lead-zinc producer and refiner, and operates metallurgical coal mines and coking plants. Frisco is a notable producer of fluorspar, lead, silver, and zinc, and participated in the equity of Minera Real de Ángeles S.A. de C.V.'s silver-lead-zinc operations and Minera Cumobabi S.A. de C.V.'s molybdenum operations. Sanluis is an important producer of fluorspar, gold, and silver as well as ingot aluminum through its equity participation in Aluminio S.A. de C.V. (ALUMSA).

At mid-1984, the capital stock of companies held by commercial banks nationalized in September 1982 were offered for sale to the public. Some companies' shares were purchased, some companies were passed to State governments, and others were closed out. Shares of mining companies in Mexico

held by the former commercial banks included Frisco, 70% of total shares; Sanluis, 34%; Cía. Minera Autlán S.A. de C.V., and La Domincia S.A. de C.V., 5.5%. The purchasers of these mining shares were the private companies themselves.

Major mining companies with significant Government equity participation include Mexicana de Cobre S.A.—operator of La Caridad Mine—and Cía. Minera de Cananea S.A., the country's largest copper producers. Mexicana de Cobre was also Mexico's largest molybdenum producer. The Mexican Government's direct role as a mineral producer was carried out by the Comisión de Fomento Minero (CFM) and the Fideicomiso de Minerales No Metálicos Mexicanos (FNMM). Both operated as decentralized agencies within the Federal Government under the policy guidance of the Dirección General Minerometalúrgica within the Secretary of Energy, Mines and Parastate Industries (SEMIP). CFM celebrated its 50th anniversary in 1984 and was involved in a large number of mineral operations to produce coal, copper, fluorspar, gold, iron ore, manganese, phosphate rock, silver, and sulfur. CFM had a majority equity position in 11 mining companies and a minority position in 9 mining companies. FNMM was a producer of industrial minerals, chiefly barite and graphite. CFM functioned through 19 regional offices and operated 21 beneficiation plants in the most important mining districts of Mexico especially to service the needs of the small- and medium-size mining group. The Consejo de Recursos Minerales (CRM), also decentralized under SEMIP, was also set up to assist the small- and medium-size group with a program of geological exploration and mineral resources evaluation.

Cámara Minera de México (CAMIMEX), the trade association for the mining sector, also served as an advisory body and as a channel of communications with the Government. CAMIMEX appointed a special committee to prepare a list of recommendations for Government action to assist the mining sector during the current economic crisis.

Government Policies and Programs.—The National Energy Plan issued by SEMIP accentuated Mexico's growing concerns about energy conservation and environmental damage. This new plan sets out some guidelines on energy savings. PEMEX had its own energy conservation plan. Also, PEMEX produced and marketed in the Federal District regular gas with less lead content and diesel fuel with lower amounts of sulfur to help alleviate the air pollution problem in the capital area.

In May, the President signed a decree granting certain fiscal benefits designed to stimulate the mining industry, especially the small- and medium-size operations.

In August, the President then issued a more comprehensive 5-year national program entitled "Programa Nacional de Minería, 1984-88" within the scope of the National Development Plan approved in May 1983. The program contains a detailed strategy to stimulate the mining sector. The program includes among other measures concentrating exploration efforts on regions offering the highest potential, intensifying the exploitation of minerals required for the growth of Mexico's diversified industrial sector and for the export market to earn foreign exchange, increasing the efficiency and productivity of mining operations, and supporting development of the small- and medium-scale mining group as a priority matter. The program document[3] gives a description of the current situation of Mexico's mining sector, includes statistical and graphical material on mineral production and reserves, as well as a selected list of minerals of critical interest to the country.

The International Bank for Reconstruction and Development (World Bank) was evaluating Mexico's request for a $105 million loan to participate in a $210 million program to specifically stimulate and assist the small- and medium-scale mining group. The program will encompass investments in new mining projects, expansion of current facilities, technical assistance, exploration projects, acquisition of mining and metallurgical equipment, and improvements in the regional laboratories. The different segments of the program will be implemented as relevant by the three main Government entities devoted to the mineral sector, CRM, CFM, and FNMM. The proposed loan, if granted, would be a followup to the first $140 million loan of May 1980 for the same purposes.

PRODUCTION

Output of mineral fuels—crude oil, natural gas, and coal—continued to dominate the results of Mexico's mineral industries. In 1984, Mexico accounted for 45% of total oil production in the region of Latin America and the Caribbean. Although Mexico's production of crude oil rebounded to a level short of the peak level of 1982, there was a record high in the output of petroleum products—giving Mexico near self-sufficiency. Contrary to the output trend for crude oil, output of natural gas, which is mostly associated with crude oil, continued to decrease. Coal production achieved a new historic peak level.

According to preliminary official data on the 32 mineral commodities that accounted for the major part of the value of Mexico's mining-metallurgical output, 22 commodities had higher output and 10 had lower output. Among the metallic minerals, those with the most notable upward changes were primary aluminum, 11%; antimony, 22%; arsenic, 21%; manganese, 36%; mercury, 74% to a recent high; selenium, 83%; and tungsten, 185% from the depressed level of 1983 to the highest level in the last decade. Although Mexico maintained its position as the world's leading silver producer, the modest increase was below the change that had been projected on the basis of recently expanded mining capacities and the new Real de Ángeles Mine. Gold output has been trending upward since the low point of 1973. The increase in output of iron ore and ferroalloys reflected the recovery in the steel industry. Relative to 1983, steel output increased 8% while ferroalloys increased 13% to a record high. The metallic commodities registering decreased outputs below those of 1983 included bismuth, 21%; copper, 4%; molybdenum, 31%; and strontium minerals, 28%.

Resumption of growth in Mexico's manufacturing sector was reflected generally in increases in output of the nonmetallic or industrial mineral commodities. Compared with that of 1983, output of barite increased 19%; fluorspar, 16%; magnesia, 60%; and sulfur, 17%. Output was lower for kaolin, nitrogen (ammonia), and salt.

In response to the financial crisis of the country, the mining companies were engaged in programs designed to optimize their productivity in the mines and beneficiation plants by reducing operating costs without significant reductions in employment. Moreover, important investments completed in the last 3 years in the areas of exploration, new projects, and expansions and modernization of equipment continued to be reflected in increased volume of mineral production adequate generally to cover domestic needs with a surplus for export. According to data assembled by CAMIMEX from a group of representative mining companies, investments in the mining-metallurgical sector amounted to $572 million in 1984 directed toward exploration, 4%; new projects, 43%; increased capacity and efficiency of present facilities, 26%; processing plants, 9%; and other purposes, 18%. Investments in the mining-metallurgical sector represented 7.6% of Mexico's gross fixed investment in 1980, the last year for which official data is available.[4] Total employment in this sector increased to 217,000 in 1984 or about 1.1% of the country's total.

Table 1.—Mexico: Production of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity[2]	1980	1981	1982	1983[p]	1984[p]
METALS					
Aluminum:					
Primary	42,601	43,237	41,180	39,706	43,988
Secondary	17,111	20,341	25,770	15,722	22,500
Antimony:					
Mine output, metal content[3]	2,175	1,800	1,565	2,519	3,064
Metal (in mixed bars and refined)	422	354	253	1,782	1,907
Arsenic, white[4]	6,932	6,517	4,740	4,557	5,496
Bismuth[5]	770	656	606	545	433
Cadmium:					
Mine output, metal content	1,791	1,433	1,444	1,341	1,135
Metal, refined	778	590	607	642	571

See footnotes at end of table.

Table 1.—Mexico: Production of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity[2]	1980	1981	1982	1983[p]	1984[p]
METALS —Continued					
Copper:					
Mine output, metal content[e]	184,123	232,902	229,179	195,959	189,111
Metal:					
Blister (primary only)	r87,857	r65,348	63,761	59,357	70,434
Refined:					
Primary	74,610	61,301	61,424	80,903	69,806
Secondary[e]	11,000	10,000	14,000	15,000	13,844
Total[e]	85,610	71,301	75,424	95,903	83,650
Gold:					
Mine output, metal content[e] troy ounces	176,089	198,594	214,349	198,177	226,920
Metal, refined do.	185,863	176,861	175,189	177,504	177,118
Iron and steel:					
Iron ore, mine output:					
Gross weight[7] thousand tons	7,631	r8,711	8,155	8,040	8,317
Metal content do.	5,087	r5,749	5,382	5,306	5,489
Metal:					
Pig iron do.	3,639	3,767	3,598	3,538	3,904
Sponge iron do.	1,636	1,686	1,505	1,497	1,448
Total do.	5,275	5,453	5,103	5,035	5,352
Ferroalloys:					
Ferromanganese do.	122	131	140	139	160
Silicomanganese do.	31	26	30	r1	42
Ferrosilicon do.	27	23	29	24	23
Ferrochromium	--	3	6	3	7
Other do.	1	2	1	1	2
Total do.	181	185	206	208	234
Steel, crude do.	7,156	7,663	7,056	6,978	7,509
Semimanufactures do.	6,220	6,395	5,652	5,318	5,789
Lead:					
Mine output, metal content[e]	147,176	148,916	170,172	184,261	183,314
Metal:					
Smelter:					
Primary	144,968	156,677	145,382	166,800	160,000
Secondary (refined)[e]	44,000	38,000	34,000	r29,000	25,000
Total	188,968	194,677	179,382	195,800	185,000
Refined:					
Primary (including lead content of antimonial lead)	140,294	150,550	137,238	162,461	153,788
Secondary[e]	44,000	38,000	34,000	r29,000	25,000
Total	184,294	188,550	171,238	191,461	178,788
Manganese ore:					
Gross weight[e]	447,128	578,314	508,667	350,011	476,158
Metal content	160,966	208,193	183,120	133,004	180,940
Mercury, mine output, metal content 76-pound flasks	4,206	6,962	8,558	6,411	11,140
Molybdenum, mine output, metal content	74	451	5,190	5,866	4,054
Selenium, mine output, metal content	46	12	29	24	44
Silver:					
Mine output, metal content[e] thousand troy ounces	50,052	52,916	59,175	63,607	63,872
Metallurgical products, metal content do.	45,410	50,151	46,784	58,544	53,023
Tin:					
Mine output, metal content	60	28	27	334	416
Metal, smelter, primary	1,322	838	944	1,216	e1,200
Tungsten, mine output, metal content	266	263	194	96	274
Zinc:					
Mine output, metal content[e]	235,823	206,569	242,332	266,292	290,236
Metal, smelter, primary	143,868	126,537	126,953	175,655	167,165
Metal, refined, primary	154,053	139,059	123,509	122,744	162,912
NONMETALS					
Barite	269,322	317,738	363,753	357,043	426,095
Cement, hydraulic thousand tons	r16,243	r17,978	19,298	17,068	18,752

See footnotes at end of table.

Table 1.—Mexico: Production of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity[2]	1980	1981	1982	1983[p]	1984[p]
NONMETALS —Continued					
Clays:					
Bentonite	176,028	220,454	184,918	171,140	e170,000
Common	153,472	277,766	249,069	213,775	e200,000
Fuller's earth	56,858	65,378	42,488	41,574	e42,000
Kaolin	271,041	207,824	172,390	162,000	e150,000
Diatomite	56,352	56,600	56,342	43,967	60,000
Feldspar	117,214	130,826	115,559	117,518	e120,000
Fluorspar:[10]					
Acid-grade thousand tons	492	508	409	407	344
Ceramic-grade do.	104	108	54	46	37
Metallurgical-grade do.	300	307	166	73	213
Submetallurgical-grade do.	210	193	106	79	105
Total do.	1,106	1,116	735	605	699
Gem stones value, thousands	$2,887	$7,827	$3,984	$520	NA
Graphite, natural:					
Amorphous	44,506	41,142	34,370	42,669	39,829
Crystalline	348	1,152	1,804	1,658	1,700
Gypsum and anhydrite, crude (yeso)	2,170,669	2,390,431	2,042,484	2,958,085	2,300,413
Lime, hydrated and quicklime thousand tons	4,350	4,500	4,000	3,630	e4,000
Magnesium compounds:[11]					
Magnesia	r86,987	68,578	64,605	66,300	105,701
Magnesite	15,865	12,117	22,492	23,187	e23,000
Mica, all grades	3,600	2,077	510	1,560	e1,000
Nitrogen: N content of ammonia[12]	1,547,971	1,795,647	2,029,800	1,935,500	1,772,610
Perlite	44,379	56,731	32,425	41,377	NA
Phosphate rock	396,646	503,252	653,050	785,038	793,293
Salt, all types thousand tons	6,575	7,953	5,561	4,998	5,456
Sodium compounds:					
Carbonate, natural and synthetic do.	406	401	390	400	NA
Sulfate, natural (bloedite)[13]	372,092	423,410	128,079	150,000	418,000
Stone, sand and gravel:					
Calcite, common	226,882	246,040	234,694	344,793	NA
Dolomite	378,316	371,027	353,265	285,151	329,694
Limestone[14] thousand tons	31,173	39,046	40,880	35,276	NA
Marble	164,392	171,152	119,759	149,086	NA
Quartz, quartzite, glass sand (silica)	892,963	1,009,330	828,187	929,059	937,000
Sand and gravel:					
Sand thousand cubic meters	51,033	56,392	60,339	50,987	NA
Gravel do.	33,048	36,518	39,074	33,018	NA
Strontium minerals (celestite)	40,761	41,344	31,676	37,506	27,160
Sulfur, elemental:					
Frasch process thousand tons	1,700	1,652	1,391	1,225	1,364
Byproduct:					
Of metallurgy[e] do.	115	100	100	100	160
Of natural gas do.	402	426	425	377	461
Total do.	2,217	2,178	1,916	1,702	1,985
Talc	10,088	13,733	12,270	15,092	15,000
Vermiculite[15]	545	596	522	399	NA
Wollastonite	14,400	14,602	15,599	10,784	NA
MINERAL FUELS AND RELATED MATERIALS					
Carbon black (negro de humo)	280,039	335,906	328,763	381,425	550,000
Coal, run-of-mine:					
Metallurgical thousand tons	6,602	6,849	6,833	7,181	7,117
Steam do.	408	1,237	786	1,818	2,810
Total do.	7,010	8,086	7,619	8,999	9,927
Coke:[16]					
Metallurgical do.	2,845	r2,872	2,969	2,979	NA
Imperial do.	16	12	9	9	NA
Breeze do.	91	90	8	8	NA
Total do.	2,952	r2,974	2,986	2,996	2,810
Gas, natural:					
Gross million cubic feet	1,298,581	1,482,196	1,549,921	1,479,560	1,373,457
Marketable do.	1,129,288	1,214,240	1,279,398	1,274,465	1,193,929
Natural gas liquids:					
Field condensate thousand 42-gallon barrels	139	309	654	8,300	41,824
Other do.	70,791	88,145	NA	NA	NA

See footnotes at end of table.

Table 1.—Mexico: Production of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity[2]	1980	1981	1982	1983[p]	1984[p]
MINERAL FUELS AND RELATED MATERIALS —Continued					
Petroleum:					
Crude thousand 42-gallon barrels	708,454	843,933	1,002,430	972,922	982,517
Refinery products:					
Gasoline:					
Aviation do	622	544	653	420	436
Other do	118,855	130,559	126,410	129,230	132,299
Jet fuel do	10,089	10,558	11,177	9,998	12,370
Kerosine do	15,164	15,047	16,541	14,258	11,612
Distillate fuel oil (diesel) do	89,392	98,530	84,254	81,745	85,255
Residual fuel oil do	112,903	126,665	127,621	127,819	137,213
Lubricants do	2,860	3,512	2,854	2,402	2,499
Liquefied petroleum gas do	43,829	49,595	55,042	56,539	57,115
Asphalt do	6,155	6,651	7,288	6,185	8,292
Unspecified do	6,656	7,543	7,541	7,797	2,591
Unfinished crude oil[17] do	--	--	--	1,633	14,577
Refinery fuel and losses do	18,478	21,856	22,478	28,951	22,401
Total do	425,003	471,060	461,859	466,977	486,660

[e]Estimated. [p]Preliminary. [r]Revised. NA Not available.

[1]Table includes data available through Sept. 30, 1985.

[2]In addition to the commodities listed, pumice and additional types of crude construction materials are produced, but output is not reported, and available information is inadequate to make reliable estimates of output levels.

[3]Sb content of ores for export plus Sb content of antimonial and impure bars plus refined metals.

[4]Calculated white As equivalent of metallic As content of products reported.

[5]Refined metal plus Bi content of impure smelter products.

[6]Mine output series revised beginning with 1979 to show actual mine output. Prior published data for mine output was derived from data on refined products and concentrates.

[7]Calculated from reported Fe content on the basis of concentrate and pellets containing 66% iron. Total run-of-mine output in 1984 was just under 14 million tons.

[8]Production series modified, beginning with 1979, according to available detail data on mine output per municipality and State.

[9]Calculated from reported Mn content of mine production on the basis of ore and nodules averaging 38% manganese.

[10]Beginning with 1979, revised data is obtained from the Instituto Mexicano de la Fluorita A.C.

[11]Reported erroneously as magnesite in previous editions of this chapter covering the years 1977 to 1982.

[12]Beginning in 1981, Petróleos Mexicanos (PEMEX) initiated production of liquid nitrogen, which in that year amounted to 29,540 tons; 1982—39,009 tons; 1983—44,971 tons; and 1984—47,047 tons.

[13]Series reflects output reported by Industrias Peñoles S.A. de C.V., Mexico's principal producer, plus an additional estimated 30,000 tons by a smaller operator.

[14]Excluding that for cement production.

[15]First year of production registered for vermiculite by the Consejo de Recursos Minerales was in 1980.

[16]Includes coke made from imported metallurgical coal.

[17]Specified by PEMEX as "virgin stock-28" and was processed at its refineries primarily for export.

TRADE

Mexico's foreign income from exports of crude oil increased slightly to almost $15 billion, although the quantity exported decreased slightly to 556 million barrels. This increase in value is explained by the small increase in the average composite oil price for Mexico's Maya and Isthmus crude to $26.90 per barrel from $26.42 per barrel in 1983. Crude oil exports were 57% of the total amount produced. Earnings from total exports of hydrocarbons including crude oil, natural gas, petroleum products, and petrochemicals, amounted to $16.5 billion or 68.5% of total exports. With total imports in this category amounting to only $800 million, Mexico had a very favorable balance in its overall petroleum trade. The dominance of crude oil in Mexico's international trade is shown in the following table:

	1980	1981	1982	1983	1984
Total Mexican exports value, millions	$15,308	$19,379	$21,006	$22,312	$24,054
Crude oil exports do	$9,449	$13,305	$15,623	$14,821	$14,968
Crude oil share percent	61.7	68.7	74.4	66.4	62.2
Mining, metallurgical exports value, millions	$1,347	$1,256	$887	$1,018	$1,000
Mining, metallurgical share percent	8.8	6.5	4.2	4.8	4.2

The United States continued as Mexico's most important overseas market, taking 49% of all crude oil exports compared with the 54% share in 1983. Mexico in turn was the leading supplier of crude to the United States. In October, PEMEX reduced exports by 100,000 barrels per day to help stabilize the world oil market, despite the loss of foreign exchange needed to reactivate Mexico's economy.

Natural gas exports to the United States were down again 35% in value from $354 million in 1983 to $232 million in 1984. Restraint in the domestic economy made it possible for Mexico to continue expansion of its exports of petroleum products. The changed mix of products exported in 1984 consisted of virgin stock (unfinished crude oil), 36%; gasoline, 33%; diesel, 11%; and fuel oil, 10%.

Aside from mineral fuels, CAMIMEX estimated[5] that 38% of Mexico's total mining-metallurgical output was for domestic consumption in 1984, while 62% of this output was exported. Mexico's success in its industrialization program is indicated by the fact that in the 1940's only 10% of mineral output was locally consumed. Earnings from silver exports decreased significantly because average world prices decreased from $11.65 per troy ounce in 1983 to $8.34 per ounce in 1984. Silver earnings had been as high as $676 million in 1980 when the price was $20.63 per ounce. Imports of mineral commodities generally rebounded from the depressed level of 1983 to meet the needs of a recovering economy.

In addition to crude oil, the United States was Mexico's chief market for its nonfuel mineral exports that in 1983 amounted to 61% of the total. On the other hand, Mexico relied on the United States for 71% of its imports of nonfuel mineral commodities.

For the second consecutive year, Mexico obtained a high surplus in its merchandise trade balance, as total exports increased by 8% while imports continued depressed. Nonpetroleum exports increased 19% in real terms.

Table 2.—Mexico: Value[1] of foreign trade in major mineral products

(Thousand dollars)

Exports	1983	1984	Imports	1983	1984
Crude oil	14,821	14,968	Steel products	301	474
Petroleum products	866	1,139	Petroleum products	255	348
Silver	398	338	Aluminum	36	83
Steel products	235	281	Copper	34	69
Natural gas	354	232	Nonferrous ores	43	38
Zinc	85	121	Asbestos	22	37
Sulfur	109	93	Phosphate rock	11	33
Ammonia	112	85	Clays, kaolin	12	18
Lead	35	56	Tin	9	17
Salt	42	55	Gem stones, diamond	8	12
Fluorspar	31	44	Nickel	6	10
Gypsum	29	32	Magnesium	5	4
Manganese	6	9	Tungsten	1	3
Barite	3	2	Cobalt	1	2

[1]Values have been converted from Mexican pesos (Mex$) to U.S. dollars at the average rate of Mex$159 = US$1.00 in 1983 and Mex$185 = US$1.00 in 1984.

Table 3.—Mexico: Exports of selected mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity		1982[r]	1983	Destinations, 1983	
				United States	Other (principal)
METALS					
Aluminum:					
Oxides and hydroxides		68	5	--	All to Honduras.
Metal including alloys:					
Scrap		14	323	NA	NA.
Unwrought		153	541	541	
Semimanufactures		283	529	NA	NA.
Antimony:					
Ore and concentrate		2,254	2,585	2,547	France 38.
Metal including alloys, all forms		58	182	131	Brazil 51.
Arsenic: Oxides and acids		2,466	2,625	2,535	Brazil 85; Argentina 5.
Bismuth: Metal including alloys, all forms		626	677	385	Belgium-Luxembourg 178; Spain 45.
Cadmium: Metal including alloys, all forms		354	270	146	Brazil 80; Japan 16.
Copper:					
Ore and concentrate		161,461	110,757	5,494	West Germany 37,889; Japan 29,309; Republic of Korea 16,655.
Metal including alloys:					
Scrap		59	471	363	Japan 108.
Unwrought		12,073	4,179	3,165	Belgium-Luxembourg 1,014.
Semimanufactures		972	4,481	2,939	El Salvador 900; Costa Rica 603.
Iron and steel:					
Iron ore and concentrate		161	1,340	1,339	Ecuador 1.
Metal:					
Scrap		19,741	3,197	2,468	Japan 718; France 10.
Pig iron, cast iron, related materials		57	48,142	6,073	Japan 41,108; Colombia 689.
Semimanufactures		241,000	1,023,600	700,000	NA.
Lead:					
Ore and concentrate		(2)	--		
Metal including alloys:					
Unwrought		61,883	78,986	30,043	Italy 14,139; Japan 12,522.
Unspecified		197	127	42	United Kingdom 64; Venezuela 21.
Manganese:					
Ore and concentrate		148,349	102,417	27,131	Venezuela 28,192; Norway 23,100.
Oxides		21,542	40,116	7,309	Spain 14,850; Colombia 4,785; Brazil 3,913.
Mercury	76-pound flasks	5,468	6,260	15	Brazil 3,011; Argentina 1,798; Japan 961.
Molybdenum:					
Ore and concentrate		2,504	7,482	--	West Germany 4,180; Chile 2,404; Belgium-Luxembourg 617.
Oxides and hydroxides		509	1,815	1,400	West Germany 138; Belgium-Luxembourg 120.
Nickel:					
Ore and concentrate		--	1	1	
Metal including alloys, unspecified		--	6,134	6,077	France 57.
Selenium, elemental		3	15	7	Brazil 8.
Silver: Metal including alloys, unwrought and partly wrought	thousand troy ounces	38,280	44,571	21,789	Japan 11,038; United Kingdom 4,794.
Tungsten:					
Ore and concentrate		606	545	545	
Metal including alloys, unwrought		--	15	5	United Kingdom 7; Sweden 3.
Zinc:					
Ore and concentrate		157,245	121,586	35,952	Belgium-Luxembourg 83,908; France 1,486.
Blue powder		2,094	2,865	2,686	Dominican Republic 105; Argentina 74.
Metal including alloys:					
Scrap		7	48	48	
Unwrought		14,553	79,268	49,762	China 9,573; Japan 6,043.
Semimanufactures		22,767	11,600	7,380	Brazil 1,665; Dominican Republic 1,297.
NONMETALS					
Abrasives, n.e.s.: Natural: Corundum, emery, pumice, etc		(2)	95	95	
Asbestos, crude	kilograms	17	--	--	
Barite and witherite		123,672	126,208	121,302	Cuba 2,552; Costa Rica 2,354.
Clays, crude:					
Bentonite		820	570	511	El Salvador 43; Guatemala 13.
Fuller's earth		--	1,882	--	All to Venezuela.
Kaolin		29	234	58	Costa Rica 90; Guatemala 90.
Unspecified		139	79	--	Colombia 22; Guatemala 21; Ecuador 20.

See footnotes at end of table.

Table 3.—Mexico: Exports of selected mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982[r]	1983	Destinations, 1983	
			United States	Other (principal)
NONMETALS —Continued				
Diamond: Gem, not set or strung thousand carats	35	--	--	
Diatomite and other infusorial earth	1,660	3,116	140	Argentina 1,058; United Kingdom 962; Brazil 707.
Feldspar	81	--	--	
Fluorspar:				
Acid-grade	176,398	223,046	154,449	Canada 68,396; Venezuela 150.
Other grades including ceramic	171,223	110,475	47,066	Netherlands 25,966; Canada 21,453.
Graphite, natural	28,428	19,787	19,331	Spain 308; Guatemala 48.
Gypsum and plaster thousand tons	1,330	1,904	1,724	Canada 83; Republic of Korea 41.
Magnesium compounds: Magnesite kilograms	41	--	--	
Phosphates, crude	34,428	21,846	21,846	
Precious and semiprecious stones other than diamond: Natural	1	7	4	Japan 3.
Salt and brine thousand tons	4,688	3,942	1,387	Japan 2,233; Canada 260.
Stone, sand and gravel:				
Dimension stone: Crude and partly worked	18,852	1,677	516	Italy 435; Guatemala 433.
Dolomite, chiefly refractory-grade	330	6,251	708	El Salvador 2,883; Guatemala 2,660.
Gravel and crushed rock	2,831	516	516	
Limestone other than dimension	1,769	202	202	
Quartz and quartzite	13	--	--	
Sand other than metal-bearing	16,443	7,030	6,923	El Salvador 88; Nicaragua 6.
Sand and gravel	5,044	23,594	23,594	
Strontium minerals: Celestite	26,161	38,624	38,624	
Sulfur: Elemental:				
Crude including native and byproduct thousand tons	900	997	629	Morocco 136; United Kingdom 121.
Colloidal, precipitated, sublimed	(2)	1	1	
Unspecified	--	24	--	All to Guatemala.
Talc, steatite, soapstone, pyrophyllite kilograms	11	--	--	
Vermiculite	39	--	--	
Other: Crude	145	221	--	Nicaragua 160; Brazil 40.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	22,546	82,738	82,364	Guatemala 203; Dominican Republic 138.
Carbon: Carbon black	(2)	3	3	
Coal: All grades including briquets	14	42	--	All to Guatemala.
Coke and semicoke	(2)	90	70	El Salvador 20.
Petroleum:				
Crude thousand 42-gallon barrels	544,614	561,005	300,700	Spain 58,906; Japan 50,280.
Refinery products:				
Liquefied petroleum gas do	431	1,598	NA	NA.
Gasoline, motor do	57	7,906	1,170	NA.
Kerosine and jet fuel do	173	1,151	611	NA.
Distillate fuel oil do	947	8,928	2,237	NA.
Lubricants do	--	75	NA	NA.
Residual fuel oil do	12,981	11,095	7,049	NA.

[r]Revised. NA Not available.
[1]Table prepared by H. D. Willis.
[2]Less than 1/2 unit.

Table 4.—Mexico: Imports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1982[r]	1983	Sources, 1983	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	43,260	26,658	15,656	Guyana 7,931; Suriname 3,000.
Oxides and hydroxides	103,463	92,925	92,509	West Germany 339; France 51.
Metal including alloys:				
Scrap	11,459	6,390	6,302	Canada 70; Japan 18.
Unwrought	28,273	10,804	7,722	Canada 2,334; France 747.
Semimanufactures	49,654	5,877	NA	NA.
Unspecified	25	20	20	

See footnotes at end of table.

Table 4.—Mexico: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982[r]	1983	Sources, 1983	
			United States	Other (principal)
METALS —Continued				
Arsenic: Metal including alloys, all forms kilograms	509	1,245	1,245	
Beryllium: Metal including alloys, all forms do.	48	--		
Bismuth: Metal including alloys, all forms	81	3	3	
Cadmium: Metal including alloys, all forms kilograms	243	2,036	2,036	
Chromium: Ore and concentrate	43,245	32,868	23,065	Panama 8,000; Cuba 1,010.
Cobalt: Metal including alloys, all forms	90	84	56	Belgium-Luxembourg 22; Canada 5.
Copper: Metal including alloys, all forms	23,691	13,053	13,043	West Germany 6; Italy 3.
Iron and steel:				
Iron ore and concentrate	1,076	157	152	Guatemala 5.
Metal:				
Scrap	420,904	353,790	343,837	West Germany 6,646.
Pig iron, cast iron, related materials	44,434	3,834	2,770	Canada 929; Brazil 124.
Steel, primary forms	89,300	40,376	17,183	Italy 19,516; France 3,484.
Semimanufactures:				
Bars, rods, angles, shapes, sections	13,272	1,596	1,547	West Germany 37; Austria 5.
Rails and accessories	28,930	17,293	17,293	
Lead: Metal including alloys:				
Scrap	902	236	236	
Unwrought	112	6	5	West Germany 1.
Unspecified	78	2	2	
Magnesium: Metal including alloys, all forms	2,686	2,031	1,764	Norway 180; Panama 82.
Manganese: Ore and concentrate	59,320	297	297	
Mercury 76-pound flasks	11	--		
Molybdenum:				
Ore and concentrate	240	(2)	(2)	
Metal including alloys:				
Unwrought	43	(2)	(2)	
Unspecified	9	1	1	
Nickel:				
Matte and speiss	4,312	1,225	872	Cuba 167; Canada 121.
Metal including alloys, semimanufactures	112	70	44	France 19; Norway 3.
Platinum-group metals: Metals including alloys, unwrought and partly wrought:				
Palladium troy ounces	2,894	1,061	--	All from Switzerland.
Platinum do.	96	96	64	Switzerland 32.
Unspecified do.	3,890	772	772	
Selenium, elemental	21	10	10	
Tin:				
Ore and concentrate	973	1,937	1,375	Peru 350; Thailand 201.
Metal including alloys:				
Scrap	405	272	272	
Unwrought	454	423	422	Bolivia 1.
Titanium: Ore and concentrate	41,994	45,943	11,946	Australia 33,997.
Tungsten: Metal including alloys, all forms	50	10	9	Brazil 1.
Zinc:				
Blue powder	207	36	30	Japan 6.
Metal including alloys:				
Scrap	14	5	5	
Unwrought	1	--		
Zirconium: Ore and concentrate	4,173	6,114	5,914	Australia 200.
NONMETALS				
Abrasives, n.e.s.: Natural: Corundum, emery, pumice, etc	1,490	1,354	1,266	Spain 63; West Germany 24.
Asbestos, crude	55,732	32,846	10,328	Canada 18,140; United Kingdom 2,010.
Barite and witherite	190,601	90,553	63,492	China 27,060.
Boron materials: Crude natural borates	170	530	502	Argentina 18; West Germany 5.
Clays, crude:				
Bentonite	5,459	481	481	
Kaolin	67,234	60,429	59,577	United Kingdom 753; Spain 58.
Unspecified	131,013	94,707	93,530	France 690; West Germany 268.
Cryolite and chiolite	98	46	(2)	Denmark 43; West Germany 1; Switzerland 1.
Diatomite and other infusorial earth	216	266	265	West Germany 1.

See footnotes at end of table.

Table 4.—Mexico: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1982[r]	1983	Sources, 1983	
			United States	Other (principal)
NONMETALS —Continued				
Feldspar, fluorspar, related materials	5,517	1,810	1,645	Canada 101; Spain 63.
Graphite, natural	363	194	83	Canada 104; West Germany 5.
Gypsum and plaster	22,403	4,240	4,240	
Magnesium compounds: Magnesite	89	3	3	
Mica:				
Crude including splittings and waste	129	46	40	Belgium-Luxembourg 3; Brazil 3.
Worked including agglomerated splittings	45	40	32	Belgium-Luxembourg 8.
Phosphates, crude thousand tons	1,036	1,115	325	Morocco 790.
Potassium salts, crude	117,981	158,325	59,777	Spain 58,250; West Germany 40,298.
Precious and semiprecious stones other than diamond: Natural	[2]	—		
Quartz crystal, piezoelectric kilograms	5,119	9	9	
Salt and brine	1,106	448	447	West Germany 1.
Stone, sand and gravel:				
Dimension stone, crude and partly worked	4,923	263	1	Guatemala 260; Brazil 2.
Calcite, common	1,961	1,304	1,286	Italy 18.
Dolomite, chiefly refractory-grade	2,156	97	23	Panama 74.
Quartz and quartzite	4,578	594	279	Sweden 277; Spain 18.
Sand other than metal-bearing	247,940	35,317	35,290	Panama 27.
Sand and gravel	35,163	2,106	2,106	
Sulfur: Elemental:				
Crude including native and byproduct	542	322	322	
Colloidal, precipitated, sublimed	364	178	176	West Germany 2.
Talc, steatite, soapstone, pyrophyllite	93,676	71,937	71,774	Italy 163.
Vermiculite	679	441	441	
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	4,572	412	412	
Carbon: Carbon black	374	191	191	
Coal:				
Lignite including briquets	6,571	5,372	5,372	
All grades including briquets	644,751	272,869	171,494	Colombia 87,864; Panama 13,461.
Coke and semicoke	89,234	51,490	31,934	Panama 19,516; Canada 40.
Gas, natural: Gaseous million cubic feet	1,934	1,716	1,694	NA.
Peat including briquets and litter	524	257	257	
Petroleum refinery products:				
Liquefied petroleum gas thousand 42-gallon barrels	1,315	3,793	NA	NA.
Gasoline do.	45	46	NA	NA.
Mineral jelly and wax do.	19	58	51	NA.
Kerosine and jet fuel do.	439	385	NA	NA.
Lubricants do.	1,188	2,059	NA	NA.
Petroleum coke do.	402	239	179	United Kingdom 50; Switzerland 10.

[r]Revised. NA Not available.
[1]Table prepared by H. D. Willis.
[2]Less than 1/2 unit.

COMMODITY REVIEW

METALS

Aluminum.—ALUMSA, partly owned by Sanluis, initiated an expansion project at its plant in Veracruz to increase its productive capacity from 44,000 to 94,000 tons per year of ingot aluminum. The $67 million project will require 2 years' construction time. ALUMSA, Mexico's sole producer of ingot aluminum, was negotiating the acquisition of ALCAN Mexicana S.A. de C.V., to be renamed ALMEXA S.A. de C.V. ALCAN was chiefly involved with the milling and extrusion of aluminum. According to El Instituto del Aluminio A.C., consumption of aluminum ingots rose to 117,500 tons in 1984, a 43% increase over that of 1983, while imports of aluminum products rose to 60,500 tons, a 155% increase over those of 1983.

Antimony.—Peñoles decided to increase the capacity of its byproduct plant for producing antimony trioxide in order to meet local and foreign demand. The expanded

capacity will be available in mid-1985.

Copper.—The major part, 91%, of the copper produced by Mexico came from six large mining companies, which also produced gold and silver as byproducts. Because of the low world copper price, these associated precious metals economically supported a number of copper operations. However, at the lower 1984 prices of gold and silver, many of the small- and medium-size copper operators reached a marginal level, forcing some to shut down while others compensated by increasing production.

Output from Mexico's largest copper mine, La Caridad in Sonora State, was affected by labor strikes during the year. Pending completion of its new smelter, La Caridad shipped most of its copper concentrate to foreign markets with a small amount delivered to Cananea's smelter. Although Mexico's total mine output decreased, Peñoles' mine output increased by 27% over that of 1983 to 4,390 tons of copper while MEDIMSA'S output increased by 18% over that of 1983 to 16,780 tons. MEDIMSA's completion of expansion of the mine and beneficiation plant of its San Martín unit at Sombrerete, Zacatecas, will increase copper output in 1985 from this unit alone to 14,000 tons, compared with its current level of 5,000 tons per year.

At a reduced level because of lack of financing, Mexico continued its program to gain self-sufficiency in blister copper in the near future. La Caridad's new 180,000-ton-per-year smelter was further delayed in its construction, and it appeared that the plant would not go on-stream before late 1985. The mine, mill, and smelter expansion program of Cananea continued to suffer delays because of financing problems. Work proceeded on its project to increase the ore grinding capacity of its beneficiation plant to 80,000 tons of ore per day. Cananea initiated construction of a second electrowinning plant that will increase its capacity to produce refined copper from 17,500 to 22,000 tons per year by 1987.

Mexico's copper consumption increased 10% above the depressed level of 1983 to an estimated 87,300 tons—reflecting the return to growth of the national economy. Increased domestic output of blister and refined copper made it possible for Mexico to reduce imports in 1984 to 21,100 tons compared with the 77,000 tons imported in 1981 when total consumption surged to 131,000 tons.

Gold.—As the world's largest silver producer, Mexico was a modest producer of gold—about 1% of the Republic of South Africa's output. More intensive exploration for gold was undertaken in 1984 but with little reported success. However, a number of new development projects as well as expansion of established silver-lead-zinc mines created the prospect that gold output would increase in the near future.

Peñoles continued development and underground exploration of its La Cienga project in the State of Durango, confirming substantial reserves of good-grade gold and silver ore. At yearend 1984, an $11.5 million investment was approved to start this new mining operation at an initial rate of 90,000 tons of ore per year. The planned metallurgy will include cyanidation and flotation. Sanluis was planning the construction of a refinery for precious metals at Durango in Durango State to begin in the first half of 1985.

Cía. Fresnillo S.A. de C.V., owned 60% by Peñoles and 40% by AMAX Inc., reinitiated construction of the mill at Sultepec in the State of Mexico. This new mining unit with a capacity of 700 tons per day will produce gold, silver, lead, and zinc and be ready by mid-1985. Its output will improve the supply of concentrate to the Met-Mex Peñoles metallurgical complex. Fresnillo was Mexico's leading gold producer, followed by MEDIMSA and Sanluis.

Gold production accounted for 5% of Mexico's total value of mineral production in 1984. Guanajuato was the leading gold producing State, followed by Durango (San Dimas Municipality), Sonora, Chihuahua, and Zacatecas.

Both established private gold producers, Peñoles and MEDIMSA, reported increases in gold mine output of 11% and 5.4%, respectively, relative to that of 1983. Peñoles' mine output increased to 51,470 troy ounces while refined gold output, including concentrate from other mine producers, increased 19% over that of 1983 to 138,000 troy ounces. This represents 61% of Mexico's total output. On the other hand, MEDIMSA's refined gold output from its metallurgical complex decreased 29% below that of 1983 to 45,800 ounces.

Iron Ore.—Run-of-mine iron ore output of 14 million tons was similar to the 1983 level. Of the six chief producers, the Peña Colorada Mine in Colima State operated by the Benito Juárez Consortium was the main iron ore producer, contributing 32% of

Mexico's gross mine output, followed in importance by the Las Truchas and La Perla operations.

Startup of the new 3-million-ton-per-year pellet plant in Monclova, Coahuila, completed in 1983, brought Mexico's pellet capacity to 11.7 million tons per year. In 1984, 7.1 million tons of iron ore pellets was produced. To rationalize its pellet output, Fundidora de Monterrey S.A. (FMSA) initiated studies on relocating its pellet plant at Monterrey to Monclova. FMSA's new concentrator for its Hércules Mine was practically completed during the year and expected to be ready for startup in the first quarter of 1985.

Iron and Steel.—Steel output increased 8% over that of 1983 in response to the country's economic recovery. Mexico ranked 20th in the world. Production of sponge iron slightly decreased from that of 1983, while that of pig iron increased 10%. Capacity utilization in the steel industry increased to 74% compared with the 65% rate in 1983 as a result of recovery in the automobile industry, export demand, and import substitution.

State-owned steel companies grouped under the holding company Siderúrgica Mexicana (SIDERMEX), accounted for 58% of national output, while private companies produced the balance, of which nonintegrated plants represented 16%. The largest integrated steel producer continued to be Altos Hornos de México S.A. (AHMSA) in Monclova, Coahuila, at a level of 2.5 million tons, ranking it 41st in the world. Of the five most important steel producers, AHMSA and FMSA had output increases of 11% and 53%, respectively, over those of 1983, while Tubos de Acero de México S.A.'s (TAMSA) output of seamless tubes decreased by 12% below that of 1983. Pig iron was produced only by the SIDERMEX companies, while the privately owned plants of Hojalata y Lamina S.A. and TAMSA produced all the sponge iron using natural gas.

Exports of finished steel products by the SIDERMEX companies amounted to 600,000 tons and were shipped to Algeria, Belgium, Canada, Egypt, the Federal Republic of Germany, Iraq, Syria, and the United States. Total exports of steel products decreased to 886,000 tons in 1984 valued at $281 million. During expansion of its steel capacity, Mexico's steel exports have increased from 191,000 tons in 1970 to an historic high of 1,023,600 tons in 1983. During the same period, steel export earnings increased from $30 to $235 million. The major exports were welded and seamless pipes, followed by plate and sheet and corrugated rod. Mexico's exports of welded and seamless pipes to the United States was 231,300 tons or 87% of its total exports of this category.

In December, Mexico entered into an export-restraint accord with the U.S. International Trade Commission. Mexico agreed to limit its finished-steel shipments to 0.3% of the U.S. apparent steel consumption. The expected amount of Mexican steel exports would be 245,000 tons, representing about 28% of its total steel exports in 1984.

As for new investments, the major activity was continued by Siderúrgica Lázaro Cárdenas-Las Truchas S.A. (SICARTSA), the third parastate company within SIDERMEX. At yearend 1984, SICARTSA's phase 1 development program achieved a financial advance of 45% with an investment of $1.22 billion. The financial crisis of Mexico delayed the advance of some project components. As a result, the extent of completion among plants was uneven. For example, the new direct-reduction plant had a physical advance of 96%, while the mine and plate mill projects advanced 47% and 41%, respectively.

Ferroalloys.—Compared with that of 1983, production of ferroalloys increased by 13% to an historic high. Although Mexico had Latin America's largest single producer of ferroalloys, it ranked second in Latin America after Brazil in total output. Considering Mexico's abundance of manganese resources, ferromanganese and silicomanganese accounted for 68% and 18%, respectively, of total ferroalloy output.

Of the total ferroalloys produced in 1984, most was consumed by the domestic steel industry while 26% was exported, principally to the United States. The other markets comprised Japan, Colombia, Guatemala, El Salvador, and Ecuador. Mexico imported 9,000 tons of ferroalloys, especially ferronickel, since Mexico does not mine nickel. Revised projection of domestic demand for ferromanganese give 116,000 tons for 1985 and 130,000 tons for 1987—indicating that Mexico will continue to have a surplus of ferromanganese for export in the near future.

Lead and Zinc.—In Mexico, lead and zinc are often found together with silver in complex ores and generally their output reflects changes in silver output. During 1984, zinc output increased significantly

because of greater silver production and in response to improved world zinc prices.

Both Peñoles and MEDIMSA operated lead and zinc refineries at their metallurgical plants, for Peñoles at Torreón, Coahuila, and for MEDIMSA at Monterrey, Nuevo León, and San Luis Potosí, San Luis Potosí. Peñoles' output of refined lead reached a recent high of almost 119,000 tons. The amount of lead concentrates received at Torreón was the greatest in the history of Peñoles. Lead concentrates were supplied by 104 of the 130 mineral concentration plants throughout Mexico. The small- and medium-size mines supplied 20% of the total, and 4,500 tons of concentrates was imported because of prior commitments.

Mexico's consumption of refined lead increased slightly to 86,300 tons or 48% of its total refined output. There has been a gradual decrease in production of refined lead from secondary sources (scrap) as antimonial lead batteries are replaced with lead-calcium batteries using less lead.

Mexico's output of refined zinc reached a record high of almost 163,000 tons, or 56% of mine output, because of the second full year of operations of MEDIMSA's new refinery in San Luis Potosí, which operated at 75% of its capacity. Zinc metal output by MEDIMSA has more than doubled from 40,000 tons in 1980 to 82,000 tons in 1984.

MEDIMSA's new Rosario unit, with a capacity of 600 tons of ore per day, was nearing completion at yearend and expected to start up in October 1985. The mine itself was completed but the beneficiation plant and infrastructure works continued under construction. The Rosario unit in Sinaloa State will produce lead-zinc concentrates with some silver.

Manganese.—Increased steel output in Mexico and the United States stimulated a rebound in Mexico's manganese output relative to the depressed level of 1983. Practically all of the manganese ore was mined in Molango and Pachuca, Hidalgo State, with minor amounts in Durango, Zacatecas, and Chihuahua. Autlán, operating in the Molango District, continued as the leading producer of manganese ore and ferroalloys.

Autlán reported a 13% increase in the output of manganese carbonate ore to 647,400 tons and a 51% increase in manganese oxide nodules to 431,000 tons relative to that of 1983. Approximately three-fourths of output of carbonate ore at the Tetzintla Mine was by underground mining as the surface reserves diminished. Production of battery-grade ore at the Nonoalco Mine, reputed to be the largest of this type in the world, was cut back to 19,000 tons from the 32,000-ton level in 1983 to control inventories. Autlán exported 163,000 tons of oxide nodules and 14,700 tons of battery-grade ore in 1984, both in increased amounts. Of the six types of ferroalloys produced by Autlán, high-carbon ferromanganese increased 14% to 117,000 tons, and ferrochrome increased by 173% to 6,860 tons, both relative to that of 1983.

Autlán continued operation of the pilot plant at its Molango unit to study the production of electrolytic manganese dioxide. The feasibility study on an industrial plant to produce 6,000 tons per year of this material was completed by Bechtel Civil & Minerals Corp.

Proven reserves of manganese carbonate ore were reported by Autlán at the increased level of 3 million tons, sufficient for 29 years at the company's current output level. Autlán estimates that the Molango District has probable ore reserves of 200 million tons capable of being treated economically with present metallurgical methods.

Molybdenum.—After 4 years of remarkable growth, molybdenum output decreased for the first time because of slack demand and low average world prices, which decreased from $4.20 per pound in 1983 to $3.40 per pound in 1984. In addition, by-product output from La Caridad's copper operations decreased because of labor strikes and problems in the milling facilities. La Caridad's output decreased from 4,600 tons in 1983 to about 3,000 tons, while output from the other major producer, Minera Cumobabi, decreased slightly to 1,182 tons as reported by the controlling company, Frisco.

Frisco reported the completion in the second half of 1984 of all the equipment needed to produce high-purity molybdenum sulfide, the initial output of which was 123,400 pounds. Two grades will be marketed, "technical grade" and "fine grade." Molybdenum sulfide is used primarily in the manufacture of grease and lubricants.

Silver.—Mexico extended its position as the world's leading silver producer. Most of the increased output was due to improved mining operations of Peñoles, Mexico's leading producer, and Real de Ángeles, which had its second full year of operations. Peñoles' mine output, including its share of Fresnillo's operations, expanded by 14% to 19.4 million troy ounces while its output

from the Torreón refinery increased to 42 million ounces of refined metal compared with the 33.5 million ounces of 1983. Real de Ángeles mine production increased by 16% to slightly more than 9 million troy ounces, making it Mexico's third most important silver producer after Peñoles and MEDIMSA. At yearend, it was milling 13,000 tons of ore per day.

MEDIMSA's mine output increased by 8% over that of 1983 to 14.2 million troy ounces; however, refined silver output from the Monterrey plant decreased by 6% below that of 1983 to 20.3 million troy ounces. MEDIMSA completed expansion of its highly automated underground mine of the San Martín unit at Sombrerete, Zacatecas, with an increased capacity from 2,400 to 6,800 tons of ore per day. Beginning in 1985, this unit was expected to produce annually concentrates containing 5.6 million ounces of silver, 74,000 tons of zinc, and 14,000 tons of copper. An additional investment to the $63 million already spent would also enable production of 6,000 tons of lead-silver concentrate. This expansion will strengthen MEDIMSA's position in Mexico as the leading lead-zinc producer and rival Peñoles as the leading silver producer.

The result of a drilling program at Mexico's largest open pit silver mine, Real de Ángeles, uncovered ore-grade mineralization at depth. At yearend 1984, Real de Ángeles had ore reserves of 65 million tons grading 80 grams of silver per ton, 1.1% lead, and 0.97% zinc.

Peñoles reported that a new ore body was found at its La Encantada unit in arid northern Coahuila with an attractive grade of silver. Underground work was initiated for its future exploitation.

Minerales Bolanos S.A. discovered a promising silver-lead vein system in Jalisco State. Limited exploration work by yearend indicated that the ore body may be among the largest deposits found in recent years. The ore contains 504 grams of silver per ton and 2.3% lead.

Silver exports represented 88% of Mexico's total silver production. The difference between the country's mine output and refined silver output is explained primarily by the silver content of the exports of blister copper, impure lead, and doré metal. Mexico, in 1984, consumed 7.37 million troy ounces of silver. Mexico continued minting the new 1-ounce, 0.999 fine "Libertad" silver coin for the investor market. The Central Bank first tested this market in 1983.

Tungsten.—Production increased 185% over that of 1983 to a new high within the last decade of 274 tons. Mexico's production of tungsten has been erratic since it was first registered in 1933 at a level of 74 tons. The recent high was in 1971 when 408 tons was produced.

Two Mexican producers, Fresnillo and MEDIMSA, account for more than 81% of total output. Fresnillo's tungsten production came from its Naica unit in Chihuahua. In 1980, Fresnillo initiated recovery of tungsten as a byproduct from its 3,000-ton-per-day flotation plant for lead-silver sulfide ores. The tungsten is recovered by a gravity process. Draco S.A., the Alfa-Inco joint venture, continued with a small output from its San Antonio surface mine in Sonora. The bulk of exported tungsten concentrate went to the United States.

NONMETALS

Barite.—Since initiating barite production in 1951 to meet the growing oil exploration program of PEMEX, Mexico exceeded the 400,000-ton level of barite output for the first time to a record high. However, this output was considerably below Mexico's recently increased capacity that has resulted from the expansion of the mines of Barita de Sonora S.A. de C.V., controlled by FNMM, and the Minera Capela S.A. (La Minita Mine) in the State of Michoacán, operated by Peñoles. Consumption of barite by PEMEX, the only important buyer in Mexico, was at the 1983 level of 390,000 tons. This gave Mexico a surplus of about 35,000 tons available for export.

Peñoles reported that barite output from its new La Minita unit in Coalcomán, Michoacán, increased by 125% over that of 1983 to 119,340 tons. La Minita also operated below its design capacity of 150,000 tons per year as PEMEX reduced its purchases. La Minita also produced silver, lead, and zinc.

Diatomite.—During 1980-83, the United States imported 75% of its imports from Mexico. The two main producers in Mexico continued to be Cía. Almeria S.A. and Diatomita San Nicolás S.A., both in the State of Jalisco.

Fluorspar.—Mexico had a significant increase in sales of fluorspar as a result of increased demand in the United States, Canada, and domestically, and a more competitive pricing policy. The Instituto Mexicano de la Fluorita A.C. reported an increase in sales from 600,000 tons in 1983 to

825,900 tons. Since mine output increased to only 700,000 tons in 1984, inventories were reduced to meet the increase in sales. Of the total sales, 282,300 tons was shipped to domestic users.

The increase in mine output was also moderated by the closing of the El Refugio Mine in Guanajuato operated by Cía. Minera Río Colorado S.A., a subsidiary of Peñoles. This company was owned 60% by Peñoles and 40% by Allied Chemical Corp. Peñoles consequently increased output at its nearby El Realito Mine operated by Fluorita de Rioverde S.A., also a Peñoles subsidiary. Before its closing, El Refugio produced 45,000 tons of acid-grade spar and 7,000 tons of metallurgical grade.

For 1984, Peñoles reported fluorspar output of 127,200 tons, mostly metallurgical grade. The second most important producer, Sanluis, reported an output of 88,550 tons, mostly acid grade, from its associated company La Domincia. MEDIMSA reported 51,900 tons from its Parral unit in Chihuahua and Frisco, 75,000 tons from its Francisco del Oro unit in Chihuahua. These four operations accounted for 80% of the country's output.

More than one-half of fluorspar exports went to the United States in 1984, and the balance was shipped mostly to Canada and European countries.

Graphite (Natural).—Mexico continued as the principal exporter of amorphous natural graphite to the United States, which during 1980-83 represented 61% of U.S. imports. Mexico also exported 75% of its output of crystalline graphite to the United States.

Magnesium Compounds.—Expanded capacity at its two chemical plants in Laguna del Rey, Coahuila, and Ciudad Madero, Tamaulipas, made it possible for Peñoles to increase production of magnesia (magnesium oxide) by 59% over that of 1983 to about 105,700 tons. A modest amount of magnesite (magnesium carbonate) was produced directly from natural sources.

Nitrogen.—PEMEX continued as the only producer of ammonia from Mexico's abundant natural gas resources. Its output of ammonia decreased again as in 1983 by 1.8% to 2.2 million tons after a long period of steady increases. Ammonia output was sufficient to satisfy the demands of Mexico's expanding fertilizer industry with a surplus for exports. PEMEX's ammonia exports, mostly to the United States, decreased substantially from 744,000 tons in 1983 to 440,000 tons in 1984, giving reduced foreign exchange earnings of $85 million. However, ammonia continued as Mexico's most important petrochemical export commodity.

Since 1962, Mexico has been engaged in an ambitious program to develop and expand its ammonia capacity to meet the needs of a more productive agricultural sector under pressure by a rapidly growing population. By yearend 1984, PEMEX had an installed ammonia capacity of 2,891,000 tons comprised of nine plants in three petrochemical centers. A second ammonia plant with a capacity of 445,000 tons per year was under construction at Camargo, Chihuahua, and a similar plant was in the design stage for the new site of Lázaro Cárdenas, Michoacán State, instead of at Salina Cruz.

Phosphate Rock.—State-owned Roca Fosfórica Mexicana S.A. de C.V. (ROFOMEX) improved production at its surface mine operation in Baja California Sur. In October, ROFOMEX completed the expansion of its milling facilities from 800 to 1,400 tons per day. The crude ore is processed by flotation methods to give a concentrate with an average grade of 30.3% P_2O_5. The entire output was shipped to the Pajaritos petrochemical complex near Coatzacoalcos, Veracruz, as the main supplier to Fertilizantes Mexicanos S.A., also State-owned.

For technical and economic reasons, ROFOMEX was considering developing an underground mine (room-and-pillar method) at its San Juan de la Costa location in Baja California Sur in addition to the surface mine. The plans to dredge phosphate-bearing sands in the Santo Domingo area on the Pacific Ocean side of the peninsula were postponed because hard stratigraphic beds were encountered.

Salt.—The downward trend in salt production continued since the peak year of 1981 when about 8 million tons was produced. Mexico was the leading salt producer in Latin America and the world's largest exporter of salt from solar facilities at Guerrero Negro on the west coast of Baja California Sur. Salt exports amounted to 4.6 million tons destined principally to Japan and the United States.

Mexico's largest producer and exporter of salt, Exportadora de Sal S.A. (ESSA), was considering diversification possibilities because of the softness in overseas markets and price stagnation. ESSA was investigating the feasibility of producing chlorine, potassium sulfate, and magnesia and its

derivatives, bromine and lithium.

Sodium Compounds.—After the United States, Mexico ranked second worldwide as a producer of natural sodium sulfate. Peñoles by far was the dominant company, operating through its subsidiary, Química del Rey S.A. At its operation at Laguna del Rey in Coahuila, Química del Rey extracts sodium sulfate from subsurface brines. Química del Rey accounts for 92% of Mexico's output and is believed to have the largest plant of its type in the world. Química del Rey's output in 1984 increased to 383,240 tons but was under the record high of 441,000 tons established in 1983 since the first processing plant started up in 1965. In the domestic market, sodium sulfate is used for the manufacture of detergents, paper, and glass. Total sales amounted to 405,000 tons, of which 71% was shipped to domestic users.

Mexico continued as a net importer of sodium carbonate (soda ash). Industria del Alcalí S.A. increased its capacity to produce synthetic soda ash at its Monterrey plant by 10% to 250,000 tons per year. Production of natural soda ash at Lake Texcoco appears to have suffered from operating problems. Mexico imported 117,000 tons of soda ash from the United States compared with 162,000 tons in 1983.

Sulfur.—Sulfur production continued at well below national capacity. Domestic sales amounted to 1.03 million tons, and exports were 841,300 tons valued at $93.4 million, a 14% decrease compared with those of 1983. The major part of exports continued to go to the U.S. market. The U.S. share increased from 63% in 1983 to 81%. Sulfur exports went to four Western countries and the U.S.S.R. in 1984, while in 1983 eight countries received Mexican sulfur. This compares with 17 countries in 1982 that took 953,000 tons. Mexico's domestic consumption was expected to rise to 1.35 million tons when the new phosphate fertilizer complex at Lázaro Cárdenas comes on-stream in 1985.

Although the Frasch process continued as the dominant source of sulfur, increased amounts were contributed by PEMEX from sour gas and by the mining companies from the metallurgical plants—especially MEDIMSA's new zinc refinery at San Luis Potosí where 150,000 tons of sulfuric acid was recovered. Peñoles produced 261,000 tons of sulfuric acid at its plants. When the new La Caridad smelter is in operation, it will produce 270,000 tons of sulfur per year in the form of sulfuric acid.

Mexican Frasch sulfur was obtained from three salt domes, Coachapa, Jáltipan, and Texistepec, in the Isthmus of Tehuantepec south of the Port of Coatzacoalcos in the Gulf of Mexico. The Texistepec Mine, operated by Cía. Exploradora del Istmo S.A., was the largest producer at 1,700 tons per day. Frasch production from Coachapa and Jáltipan was controlled by Azufrera Panamericana S.A. (APSA), headquartered in Veracruz. In September, APSA commissioned the new Petapa dome adjacent to Jáltipan with a capacity of 1,500 tons per day. APSA scheduled a new 1,000-ton-per-day mine, Otapan, for startup in late 1985 or early 1986. Increased production from the Petapa dome is expected to compensate for Jáltipan's diminishing trend and result in a further rise in Mexico's Frasch output.

MINERAL FUELS

Coal.—Run-of-mine production of metallurgical and steam coal totaled almost 10 million tons, a new historic level, while washed coal amounted to 3.3 million tons. Most of the coal was mined by subsidiaries of the steel companies for conversion into coke. The SIDERMEX steel companies accounted for 6.3 million tons of the total and were planning a 20% increase in coal output for 1985. The two major producers of metallurgical coal were Minerales Monclova S.A. and Cía. Minera la Florida de Múzquiz S.A., both subsidiaries of AHMSA, operating in Coahuila. Although steel output increased in 1984, coke output decreased by 6.2% from that of 1983 to 2.8 million tons. This reduction of coke consumption was a direct result of efficiencies in the steel industry, which required 602 kilograms of coke per ton of steel instead of 660 kilograms.

MEDIMSA was the only major private company with coal mine and coking facilities. MEDIMSA's coking coal output decreased again to 755,000 tons, of which 290,000 was sold to SIDERMEX plants, and the balance was consumed at MEDIMSA's coking plant at Nueva Rosita. MEDIMSA completed the first stage of its new underground mine, Pasta de Conchos, in San Juan de Sabinas, Coahuila, to be operated under a subsidiary, Carbonífera de Nueva Rosita S.A. By yearend, the new mine was operating at the level of 100,000 tons of metallurgical coal per year. Full capacity of 480,000 tons per year was expected by the end of 1986.

Minera Carbonífera Río Escondido S.A. (MICARE), a mixed company with the majority of shares held by the Government, continued as the largest and only significant producer of steam coal. MICARE's output from surface and underground mines in Coahuila reached a record high of 2.8 million tons of steam coal for shipment to the Río Escondido complex at Piedras Negras, Coahuila.

Natural Gas.—Most of Mexico's natural gas production is associated with its crude oil output. Of total gas output, 19% was unassociated with crude oil, compared with the 21% share in 1983. Although crude oil output increased modestly, gross natural gas output actually decreased by 7.2%, relative to that of 1983. The area of Huimanguillo in the Southeastern Zone was the major source of associated gas, accounting for 38% of the national total. This area is characterized by producing wells of volatile crude oil with a high component of natural gas or condensate. There was another sharp increase in production of condensate to 41.8 million barrels compared with the 654,000 barrels obtained in 1982, as a result of the startup of separation equipment installed on the marine platforms as well as expanded equipment in the Chiapas-Tabasco area onshore. PEMEX achieved further success in reducing the amount of flared gas to 8% of total output compared with 11% in 1983 and 17% in 1982.

PEMEX's internal gas consumption was down by 5%, and domestic sales were down by 6%, both relative to that of 1983. Reduced domestic demand resulted from the decreased needs of the Comisión Federal de Electricidad because an abundance of rainfall led to greater hydroelectric output.

The United States continued as the only export market for Mexico's surplus of natural gas. Because of a further weakening of demand in the U.S. market in 1984, PEMEX's exports of natural gas decreased again by 32% to 43.1 billion cubic feet valued at $232 million, compared with 79.4 billion cubic feet valued at $354 million in 1983. Natural gas exports to the United States that averaged 148 million cubic feet per day in 1984 was considerably below the delivery rate of 288 million cubic feet per day initiated in January 1980.

PEMEX and Border Gas Inc., a consortium of private U.S. gas companies, announced the suspension of gas exports to the United States effective November 1, 1984. Both companies agreed to meet periodically thereafter to analyze the supply-demand situation in Mexico and the United States and to discuss conditions for the possible resumption of exports.

Petroleum.—PEMEX continued its active program of exploration to uncover new reserves of hydrocarbons and to evaluate areas with potential. During the year, 10 crude oilfields were discovered onshore and 3 offshore. The three offshore oilfields in the Bay of Campeche correspond to the wells Batab 1-A, Chuc 101, and Caan 1. The Batab 1-A well produced a light crude and is particularly significant for future development because of its deep source in the Kimmeridgian Jurassic bed. These three offshore discoveries also importantly increased the extension of the marine area. The new additions to Mexico's reserves partially compensated for the 1.33 billion barrels of liquid hydrocarbons extracted during the year. Reserves are adequate for 54 years at current production levels.

In the established fields, PEMEX drilled 228 development wells, with an 85% success rate. Most of the drilling equipment for field development was concentrated in the Chiapas-Tabasco Mesozoic area because of the high productivity of the wells. In the Bay of Campeche, 23 fixed platforms were in operation at yearend. To maintain its output level of hydrocarbons, PEMEX's drilling program encompassed 53 fields, of which 36 provided crude oil and associated gas and 17, unassociated gas only. A total of 303 exploratory and development wells were drilled in 1984, exceeding the number in 1983 by 56.

Mexico's production of crude oil in 1984 averaged 2.68 million barrels per day, slightly higher than that of 1983 but below the peak of 1982. The share of crude oil contributed by wells in the Bay of Campeche in the Marine Zone increased to 65% of the country's total.

Mexico exported almost 57% of its crude oil output at a rate of 1.52 million barrels per day. Exports were comprised of 41% Isthmus light crude and 59% Maya heavy crude. The Maya crude accounted for 56% of the total in 1983. PEMEX exported crude to 22 countries, the major part of which (49.2%) went to the United States, followed by Spain, Japan, the United Kingdom, and France. In August, Mexico and Venezuela agreed to maintain for the fifth consecutive year the San José Agreement regarding oil exports to Central American and Caribbean countries on a special basis. In May, market

changes made it possible for PEMEX to increase the price of Maya heavy crude from $25.00 to $25.50 per barrel, while the light Isthmus crude remained constant at $29.00 per barrel.

PEMEX's total overseas sales were divided as follows: crude oil, 90.9%; petroleum products, 6.9%; natural gas, 1.4%; and petrochemicals, 0.8%. Exports of petroleum products, which increased by 32% over those of 1983 to a rate of 111,900 barrels per day for a value of $1.1 billion, were composed mostly of virgin stock (unfinished crude oil), gasoline, diesel, and fuel oil, while imports were mostly of liquid gas and lubricants, amounting to only $255 million. The figures above indicate a very favorable balance in Mexico's international trade of petroleum products. The steady growth in refinery capacity has made it possible for Mexico to become self-sufficient in a number of products with large surpluses for export. During 1984, PEMEX completed expansion of the capacity to process crude oil at the refinery centers at Poza Rica and Salamanca while expansion works continued at Tula and Salina Cruz. PEMEX operated nine primary refinery centers in Mexico with an installed capacity of 1.35 million barrels per day.

Mexico continued as the leading supplier of foreign oil to the United States, followed by the United Kingdom, Canada, Saudi Arabia, and Indonesia.

In November, PEMEX experienced the worst accident in its history when a propane-butane storage and distribution center in San Juan Ixhuatepec near Mexico City exploded and burned. Over 1,000 people were killed or injured, and millions of dollars in damages were sustained.

Table 5.—Mexico: Petroleum and natural gas production

Zone and district	Natural gas (million cubic feet)		Crude oil[1] (thousand 42-gallon barrels)	
	1983	1984	1983	1984
Marine Zone: Bay of Campeche	328,999	348,383	610,947	636,074
Southeastern Zone:				
Villahermosa[2]	735,270	664,609	268,228	263,878
Comalcalco District	5,217	7,410	5,047	6,047
Ciudad Pemex	120,551	101,033	5	5
Total[3]	861,047	773,052	273,279	269,929
Central Zone:				
Poza Rica	41,289	35,575	32,856	28,267
Cuenca Papaloapan	23,134	21,909	3,688	2,843
Nueva Faja de Oro	15,948	9,870		
Total	80,371	67,354	36,544	31,110
Southern Zone:				
Aqua Dulce District	19,942	16,865	17,782	15,711
El Plan District	19,489	17,476	15,374	12,229
Nanchital District	1,427	1,397	1,578	1,477
Total	40,858	35,738	34,734	29,417
Northern Zone:				
Northern District	15,231	14,020	10,054	9,161
Southern District	9,418	7,589	7,145	6,629
Northeastern Frontier District	143,636	127,321	219	198
Total[3]	168,285	148,930	17,418	15,987
Grand total	1,479,560	1,373,457	972,922	982,517

[1]Does not include condensate.
[2]Referred to as Mesozoic in 1983.
[3]Data may not add to totals shown because of independent rounding.

Source: Petróleos Mexicanos, Memoria de Labores, 1983 and 1984.

Table 6.—Mexico: Salient crude oil statistics[1]

		1980	1981	1982	1983	1984
Production	thousand 42-gallon barrels	708,454	843,933	1,002,430	972,922	982,517
Exports:						
Quantity	do.	302,129	400,778	544,614	561,005	556,479
Value	millions	$9,449	$13,305	$15,623	$14,821	$14,968
Share of total Mexican exports	percent	62	69	74	66	62
To the United States:						
Total	thousand 42-gallon barrels	[2]194,172	[2]177,510	[r]266,320	[r]300,700	273,790
Share of total U.S. imports	percent	10	10	19	23	19

[r]Revised.
[1]Based on annual reports of Petróleos Mexicanos, Memoria de Labores.
[2]Based on U.S. Department of Commerce import data.

Table 7.—Mexico: Proven hydrocarbon reserves

(Million 42-gallon barrels unless otherwise specified)

Zone	Dry natural gas (billion cubic feet)	Liquid hydrocarbons				
		Crude oil	Condensate	Dry natural gas liquid equivalent	1984 Total	1983 Total
1983 total	76,998	49,911	7,185	15,404	XX	72,500
1984:						
Marine (Bay of Campeche)	12,366	28,506	3,309	2,473	34,288	34,467
Chicontepec	26,705	10,916	1,321	5,341	17,578	17,581
Southeastern	24,513	7,320	2,003	4,903	14,226	14,684
Northern	8,390	388	261	1,677	2,326	2,373
Central	3,523	1,262	183	705	2,150	2,194
Southern	1,206	868	73	241	1,182	1,201
Total	[1]76,702	49,260	7,150	15,340	71,750	XX

XX Not applicable.
[1]Data do not add to total shown because of independent rounding.

Source: Petróleos Mexicanos, Memoria de Labores, 1983 and 1984.

Uranium and Nuclear Energy.—Uranio Mexicano S.A., the state entity once responsible for uranium exploration and production, was not active in 1984 and ceased to exist. Reportedly in the near future, CRM will assume responsibility for exploration, while the CFM will continue construction of the metallurgical plant and eventually begin production of yellow cake. By law, uranium-related activities may be undertaken only by the Government.

[1]Physical scientist, Division of International Minerals.
[2]Where necessary, values have been converted from Mexican pesos (Mex$) to U.S. dollars at the average controlled rate for 1984 of Mex$167.77 = US$1.00. The average free rate in 1984 was Mex$185.19 = US$1.00.
[3]Poder Ejecutivo Federal. Program Nacional de Mineria 1984-1988. Mexico City, Aug. 1984, 94 pp.
[4]Page 35 of work cited in footnote 3.
[5]Cámara Minera de México. Report to the XLVIII General Assembly. Mexico City, May 1985, p. IV.

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